



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/640,340

08/12/2003

Liang Liu

7701

25859

7590

05/30/2006

WEI TE CHUNG
FOXCONN INTERNATIONAL, INC.
1650 MEMOREX DRIVE
SANTA CLARA, CA 95050

EXAMINER

STADLER, REBECCA M

ART UNIT

PAPER NUMBER

1754

DATE MAILED: 05/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/640,340	Applicant(s) LIU ET AL.	
	Examiner Rebecca M. Stadler	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 19 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

Applicant's arguments with respect to claims 1-7 and 19-20 have been considered but are moot in view of the new ground(s) of rejection.

Specification

The amendment filed on 3/16/2006 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "growth-affective". The Examiner suggests the phrase "catalyst-doping" or "catalyst dopant," which would be supported by the original disclosure.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-7 and 19-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The phrase "growth-affective" is not supported by the original disclosure. As above, "catalyst-doping" or "catalyst dopant" would be supported by the original disclosure. The Examiner believes that this is what was meant in the original disclosure by "catalyst doped" and that this was the result of a translation error.

Double Patenting

Claims 1 and 19 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 17 of copending Application Nos. 10/640,432 and claim 1 of copending Application 10/745,251. Although the conflicting claims are not identical, they are not patentably distinct from each other because the only difference between claim 1 of the present invention and that of 10/640,432 is that the 10/640,432 does not have a growth-affective material. However, as discussed below combinations of catalyst materials is an obvious variation of a pure catalyst. As to 10,745,251, claim 1 of 10/745,251 requires two different materials in the catalyst. However, nothing in present claim 1 precludes two additional materials in the catalyst. The comprising claim language is open to more than one material being present in the catalyst.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Carbon Nanotube Arrays Prepared by MWCVD" (hereinafter referred to as the Yao reference) in view of USP 6,232,706 to Dai taken with USP 5,653,951 to Rodriguez.

As to claims 1 and 19, Yao discloses a carbon nanotube array on a metal surface (Fe, Ni, Co or steel), wherein the metallic surface acts as the catalyst (see Experimental Method). The Yao reference teaches that nanotubes bundles produced by CVD often bend (see Figure 2b, page 11396). As can be seen by the Figure, the nanotubes are bent and also have varying lengths. In Figure 2b, it appears that some of the nanotubes are branched nanotubes as shown in the enlarged inset. However, not all of the nanotubes are bent solely because they are branched. The Figure depicts many single nanotubes that are progressively bent in a predetermined direction.

Yao does not disclose separate nano-sized particles. However, Dai '706 discloses a device comprising: a substrate (see column 3, lines 7-8); with a plurality of nano-sized catalytic particles (see column 3, lines 19-33). It would have been obvious to one of ordinary skill in the art at the time of this invention to add the plurality of nano-sized catalytic particles to the substrate of Yao in order to control the diameter of carbon nanotubes as Dai teaches is desirable (see column 3, lines 19-24).

Dai '706 does not teach a catalyst material and a catalyst-doped material. However, Rodriguez '951 does teach a catalyst comprised of a Group VIII metal and a Group IB metal

(see column 5, lines 20-41). Of note, a preferred combination is comprised of copper in combination with iron (see column 5, lines 35-37). Because this is the same combination of materials as that disclosed in the specification of the present invention, it is axiomatic that the copper of Rodriguez would also be capable of varying a reaction rate of synthesis of carbon nanotubes. It would have been obvious to one of ordinary skill in the art at the time of this invention to use the catalyst material of Rodriguez in the device of Yao in view of Dai in order to take advantage of the structural changes provided by the copper (see column 5, line 54 – column 6, line 10, which teaches that the presence of copper generates structurally different nanotubes than when iron is used alone). Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the catalytic compositions for carbon nanotube processes, since it has been held that discovering an optimum value or a result effective variable involved only routine skill in the art. See, e.g., In re Boesch, 617 F.2d 272, 205 U.S.P.Q. 215 (CCPA 1980). The artisan would have been motivated to adjust the catalytic composition by the reasoned explanation that doing so provides structurally different types of carbon nanotubes as noted above.

As to claim 2, Dai '706 discloses that silicon can be used as the substrate (see column 3, lines 8-10) or that quartz can be used as the substrate (see claim 6, column 6, lines 24-25). It would have been obvious to one of ordinary skill in the art to use the silicon substrate of Dai in the Yao process as Dai teaches that it is an effective substrate.

As to claim 3, Rodriguez '951 discloses iron, cobalt, nickel, and ruthenium for use as catalyst materials (see column 5, lines 20-41). As to claim 4, Rodriguez '951 discloses copper (see column 5, lines 26-28). As to claim 5, the copper of Rodriguez will inherently increase or decrease the growing rates of the carbon nanotubes because it is the same material used as the present invention. It would have been obvious to one of ordinary skill in the art at the time of this invention to use the catalyst materials in the Yao in view of Dai device because Rodriguez teaches that these are effective catalysts for use in a nanotube process.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rebecca M. Stadler whose telephone number is 571-272-5956.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

rms


COLLEEN P. COOKE
PRIMARY EXAMINER